
CLAIMS

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(57) [Claim(s)]
[Claim 1] In the image formation equipment which has two or more development counters which hold the toner of a different color which develops the electrostatic latent image formed in a photo conductor, and a detection means to detect a toner end When negatives are developed combining two or more colors using said two or more development counters and said detection means detects the toner end of development counters other than the development counter developed at last, Image formation equipment characterized by having transposed the copy paper number of sheets developed to the toner and the front with development counters other than the development counter developed at last to copy assignment number of sheets, and having the control means made to develop with other development counters by this copy assignment number of sheets.
[Claim 2] Said control means is image formation equipment according to claim 1 characterized by moving the development counter which serves as a toner end after development termination to the toner exchange location where a photo conductor differs from the development location which counters.

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[Field of the Invention]
This invention relates to the toner of a specific color, and the toner control (toner supply, exchange) approach at the time especially about the image formation equipment which has two or more development counters of a different color, for example, a copying machine, facsimile, etc.
[Description of the Prior Art]
the copying machine which performs color composition combining two or more colors -- setting -- the former -- under the time of a color composition copy, for example, 3 color composition copy, -- the development color of one amorous glance -- a toner end -- if the development of required number of sheets is completed about the color, the intermediary would also switch to the following development color and will continue the copy. And if a user does not move a toner and a development counter to a toner conversion location by depressions, such as a color key, anew when carrying out toner exchange of a toner and the development counter of a color since a machine stops after the color composition copy of three colors is completed, it is **** in ****.
Moreover, when the user is separated from the machine, he may not notice generating of a toner end. When you do not notice a toner end, the unsuitable image with which the image part used as a toner end is not formed may be formed.
[Objects of the Invention]
When this invention is made based on such a background and it becomes a toner end, it aims at offering the image formation equipment which the copy paper in which the unsuitable image was formed is not outputted, and can always obtain only the copy paper of a desired image.
[Elements of the Invention]
Hereafter, it explains based on the example which shows the detail of the configuration of this invention, and an operation in drawing.
The device section inside the body of the copying machine of one format of carrying out this invention is shown in Fig. 1 . When Fig. 1 is referred to, 1 is contact glass which lays a manuscript. The optical scan system 2 is formed under the contact glass 1. The lighting lamp 3, the 1st mirror 4, the 2nd mirror 5, the 3rd mirror 6, the zoom lens 7, and the 4th mirror 8 grade are contained in the optical scan system 2.
The scan drive of the optical scan system 2 is mechanically carried out in the direction of vertical scanning, i.e., the longitudinal direction of a drawing, irradiating the light according to a manuscript image on the photo conductor drum 9. In this example, adjustment of the focal distance of a zoom lens 7 performs scale-factor adjustment with the manuscript image of a main scanning direction, i.e., a direction perpendicular to a drawing, and a copy image, and vertical-scanning speed regulation of the optical scan system 2 performs scale-factor adjustment with the manuscript image of the direction of vertical scanning, and a copy image.
Around the photo conductor drum 9, the electrification charger 10, an eraser 11, the developer 12, the imprint charger 13, the separation charger 14, and the cleaning unit 15 grade are arranged.

A copy sheet is supplied from that as which the feed system was chosen in any of a three-line **** intermediary cage and cassettes 16, 17, and 18. Moreover, the double-sided tray 19 is formed, and when performing a rear-face copy, a copy sheet is supplied from the double-sided tray 19. The feed rollers 20, 21, 22, and 23 are formed near cassettes 16, 17, and 18 and the double-sided tray 19, respectively.
The outline of a copy process is explained. The photo conductor drum 9 rotates clockwise in Fig. 1 , and a front face is charged in predetermined high potential at homogeneity. If light is irradiated by the electrified field from the optical scan system 2, potential will change according to the luminous intensity. Since the light which the optical scan system 2 irradiates corresponds to a manuscript image, the potential distribution according to a manuscript image, i.e., an electrostatic latent image, is formed in the front face of the photo conductor drum 9.
If the part in which the electrification latent image of the photo conductor drum 9 was formed passes along a developer 12, a toner will stick to the photo conductor drum 9 according to the potential distribution, and, therefore, the toner image (visible image) according to an electrostatic latent image will be formed in it.
Thus, a copy sheet is sent in to predetermined timing from the feed system chosen as the photo conductor drum 9 on which the visible image was formed, and it laps on a visible image.
And therefore, a visible image is imprinted to energization of the imprint charger 13 at a copy sheet. Therefore, it separates into energization of the separation charger 14 from the photo conductor drum 9, and the copy sheet with which the visible image was imprinted is sent out to the conveyance section.
Therefore, a visible image (toner image) is fixed to the conveyance section on a copy sheet at the ******** fixing section 24. the copy sheet which finished fixing in the case of one side copy mode -- the path change-over device 25 -- a connoisseur -- although paper is immediately delivered in the direction of arrow-head A, an intermediary and when it copies to the 1st page in double-sided copy mode, a copy sheet is stored in the double-sided tray 19 by the path change-over device 25.
The actuation board 26 is arranged on the top face of a copying machine. Moreover, it is equipped with the automatic manuscript feed gear (ADF equipment) 27 above the contact glass 1 of this copying machine, and is equipped with a sorter 28 near the delivery opening.
As a toner and a detection means, the latent image of a pattern is formed and developed to a photo conductor as an example, and a toner and a means to come out and to detect a certain thing are used as detecting that the condition below concentration continues beforehand with the concentration detector which consists of light emitting diode which detects the concentration, and a light-receiving means.
After a form passes through one location of a form path as a jam detection means using the detector which consists of a luminescence means and a light-receiving means, for example, when not detecting that the form passed through the location of a degree within predetermined time, a means to detect as a jam is used.
A developer 12 has two or more development counters. In the example of Fig. 2 , a developer 12 is formed as a rotation developer and has three development counters 12a, 12b, and 12c. Three development counters, 1st development counter 12a, 2nd development counter 12b, and 3rd development counter 12c, are formed in one rotation frame 29, respectively. Each development counters 12a, 12b, and 12c have the toner cartridge 31 in which the development sleeve 30 and desorption are possible. A predetermined color or the toner of a class is held in a toner cartridge 31, respectively.
When the rotation frame 29 of a developer 12 rotates, in the development counter chosen among 1st development counter 12a, 2nd development counter 12b, and 3rd development counter 12c, and Fig. 2 , 1st development counter 12a rotates in the 1st development counter location I which counters the photo conductor drum 9. Then, 2nd development counter 12b stands by in the 2nd development counter location II, and 3rd development counter 12c stands by in the 3rd development counter location III.
The development color feeler 32 which shows the development color of each development counter 12a, 12b, and 12c is formed in the rotation frame 29. In the example of Fig. 2 , the

development color feeler arranged in the diameter direction opposite side of the rotation frame 29 corresponds to each development counter with each development counter. It is arranged so that the development color feeler corresponding to the development counter which has photosensors 33, 34, and 35 in the 1st development counter location can be detected.
Further, the toner cartridge sensor 36 is formed in the rotation frame 29 so that the toner cartridge feeler 37 (Fig. 3) formed in the toner cartridge 31 of each development counter can be detected.
A drive motor drives by assignment [control unit], and, in drawing, the rotation frame 29 rotates clockwise. When the development color feeler 32 intercepts the 3rd photosensor 35, the color of the developer of the development counter which is in a development location with the 1st and 2nd photosensor 33 and 34 can be read. the 3rd photosensor 35 is used as a source of a signal for stopping a rotation drive, and a development location is made to carry out a migration halt of the development counter of a desired development color in the example of drawing -- things can be carried out. By rotating the rotation frame 29, one by one, the information on each development counter is detected by photosensor, and is memorized. The development color information on the development counter of each location can be detected without rotating a rotation frame, if photosensor (development color sensor) is formed to this example so that the development color feeler of the development counter of each development counter location may be detected.
A control unit has a control system as shown in Fig. 4 . Image formation equipment operates as follows with this control unit, for example.
the flow of Fig. 5 -- therefore, each routine of a initialization, color home-position input check, waiting processing, and development migration check is performed after powering on.
Processings in ordinary image formation equipment, such as reading of the key in which waiting processing contains reading of a sensor and a DIP switch (Dip SW), and mode setting, are performed. A DIP switch is turned on and turned off manually, holds the condition, and uses it for a serviceman mainly doing adjustment of a machine and a setup (attached to sorter online, double-sided unit online, automatic concentration priority, automatic form selection, a home color, etc.).
A development migration check and the usual copy sequence are performed by the print key ON after ****** in copy assignment number-of-sheets amendment processing waiting.
After continuing a copy sequence and completing a copy until copy number of sheets turns into copy assignment number of sheets and the development of the specified development color is completed when a jam does not arise and a development counter in use does not become a toner end, it returns to waiting processing.
If a jam is generated during a copy, a jam flag will be set and an exception-processing routine will be performed.
By the exception-processing routine, processing in which stop the drive of a machine, or a copy is made normally and only inside **** number of sheets returns a copy number-of-sheets counter etc. is performed.
The return from an exception-processing routine is because power-source OFF is carried out in order to reset CPU.
If a development counter in use becomes a toner end in the middle of a copy, the toner and flag of DBCOL1 (the 1st development counter location memory) will be set. It seems that an example of a RAM map which memorizes information is shown in Fig. 10.
When the development color of a toner end is the last color of a copy here, since copy continuation is impossible, it returns to waiting processing through a color home-position input check, but when it is not the last color, it amends in copy number of sheets [finishing / a copy of copy assignment number of sheets], and returns to development migration request processing.
if the toner and flag of a jam flag or DBCOL1 are set to the non-volatilized RAM area of a line crack and a RAM map (Fig. 10) by flow as shown in Fig. 6 , the subroutine of initialization will reset the toner and flag of a jam flag and DBCOL 1-3 (1st [the] - the 3rd development counter location memory), and will use them -- the color of the developer of the **** development

counter memory DBCOL1 is memorized to DBCOLMR (development color buffer memory).
Since it is not an initial state after exception processing by the jam or the toner end unless the jam flag, the toner, and the flag are set, RAM other than P mode (program mode) area is cleared, and it sets to initial mode, and the information on DBCOLHM (home color) is stored in DBCOLMR (buffer memory for development colors set after a power source ON).
the flow which shows development color reading processing in Fig. 7 after storing information in DBCOLMR -- therefore, it carries out.
Since the location of a development counter is changed at the time of a power source OFF, or development color reading processing is exchanged in a development counter and the contents of the developer and the location of a development counter may stop corresponding with a front condition, it is necessary to surely perform it in the case of power-source OFF->ON. [its]
If it finishes reading a development color, the color code bit of DBCOLMR and DBCOL 1-3 is measured, and the development counter location is memorized in the same color at the time with a cartridge, it is attached to the development counter, and a development migration flag is set. In addition, since it is not necessary to move a development counter in the same color at the time with a cartridge, the 1st development counter location 1, i.e., DBCOL, does not carry out the set of a development migration flag.
Subsequently, it returns by waiting processing through the subroutine of a development migration check.
In development color reading processing, as shown in Fig. 7 , 4 is first set to a development migration request counter, and a developer rotation drive motor is turned on.
The 1st photosensor 33 turns on from OFF after rotation of a developer, i.e., rotation of the rotation frame 29, and the 3rd photosensor 35 turns off a developer rotation drive motor by ********** in ON from OFF.
It is controllable so that the development color feeler 32 stops at the location of photosensors 33-35 correctly by this.
next, a development migration request counter is checked, the data of a color code and cartridge existence which resemble DBCOL 1-3, respectively and correspond to it according to a counter value are set, the decrement of the development migration request counter is carried out for a development counter color to the degree of 1 color reading ****, and it is 3 color reading **** -- a counter becomes 1 in a place and it returns to a initialization flow.
A color code can be set up as shown in Table 1 which it is set by the detecting signal of the development color feeler by photosensor, for example, is shown later.
A development migration check subroutine is performed by the flow as shown in Fig. 8 .

表 1

フォトセンサ		カラーコード		トナー色
第1	第2	1ビット	0ビット	
0	0	0	0	黒
0	1	0	1	緑
1	1	1	0	赤

If a development migration check subroutine is called and the development migration flag is set, DBCOL4 will be used as the buffer memory for migration, and information will carry out rotation to DBCOL1 ->DBCOL3 ->DBCOL2 ->BDCOL1.
Subsequently, a development migration request counter is checked and the information on development counter location memory carries out rotation to the contents being 3 like the above once again. Thus, after moving a development counter color on RAM, a development counter drive motor is turned on, the rotation frame 29 of a developer is rotated 1/3, and a development counter is moved. namely, the 1st development counter location -- a ****** development counter -- the development counter of the 3rd development counter location moves to the 2nd development counter location in the 2nd development counter location, and a ******

development counter moves to the 3rd development counter location in the 1st development counter location. The color information which has carried out rotation on 1-time RAM by this agrees to the information on the development counter after 1 / 3 rotations. If 1 / 3 rotation termination is carried out, the decrement of the development migration request counter will be carried out, and if a development migration request counter is not 1, namely, when a development migration request counter is 3 first, a developer will be rotated 1/3 once again. Consequently, a ****** development counter moves to the 3rd development counter location in the 1st development counter location at the beginning. In this case, since rotation of the color information on a development counter has been carried out twice on RAM, the information on the development counter after migration agrees with the information on RAM. A development migration flag is reset by migration termination, and it returns to the flow of Fig. 5 .

The subroutine of the color home-position input check called waiting For example, according to the flow shown in Fig. 9 , the DIP switch for inputting a development counter home-position color confirms whether to be ON or not. When the condition of a switch is [a ten key SET flag] OFF in ON, a ten key is received, and the value is two (if the color code of Table 1 is displayed in the decimal number system, since 0 and green are set to 1 and red is set to 2, black) or less. When it corresponds to three colors, the information is stored in DBCOLHM of P mode RAM area at the time of the value from which a value becomes two or less. If a home color is inputted, a ten key SET flag will be set, and if there is no actuation of OFF->ON of a DIP switch again, it can be made not to perform modification of a home color, and reinput.

Next, in Fig. 13, copy assignment number-of-sheets amendment processing is explained. When the definition of the language previously used with a flow chart is carried out, set number of sheets is a number which set the number of copies which a user needs by the ten key etc., and copy assignment number of sheets is number of sheets which repeats copy actuation, unless abnormalities, such as a jam, occur under 1 time of a print key press on a program. If an assignment development color is in copy mode of a mono-color, it will be 1 and 2 and 3 amorous glance will set [two amorous glance] it to 3. Since a toner is not necessarily suddenly lost in the process which detects a toner end with the concentration detector mentioned above, a toner and a counter are counters for getting it blocked, if a toner end approaches, carrying out counting for every copy, if less than a certain fixed concentration level, for example, considering as a toner end at 50 counts (sheet), and have memory for every color.

A call of copy assignment number-of-sheets amendment processing stores set number of sheets in copy assignment number of sheets. Next, the toner and counter of the 1st assignment development color are set to A register, if it is both sides or the composite mode in a mono-color copy, a toner and the number of sheets of until which can be remaining copied will be computed, and copy assignment number of sheets will be amended if needed. In the case of the copy mode which uses the development counter of two colors which are not mono-colors, or three colors, a toner end makes the number of sheets of the nearest development color which can be remaining copied copy assignment number of sheets.

The development migration request processing shown in the flow of Fig. 14 is processing which sets the request counter for moving the 2nd or 3rd development counter to a development location, respectively, after copy actuation of the 1st or 2nd development color is completed during a copy.

The toner and color development migration request processing which are shown in the flow of Fig. 15 are processing for making after [copy actuation termination] toner exchange, or a supply location a toner end move a ****** development counter during a copy. In this example, a development location is a toner exchange location.

As shown in Fig. 11 by this, the cartridge exchange covering 60 prepared in the frame front cover 59 of image formation equipment 58 can be removed, and cartridges can be exchanged. It is not necessary to carry out actuation for which a toner and a development counter are moved to a cartridge exchange location especially as an operator.

What is necessary is in the case of the method which carries out toner supply of the development counter from the hopper 61 which is upwards, just to set up a control flow so that a toner and a development counter may be moved to the toner supply location in a location

which is different from a development location as shown in Fig. 12, for example, the 3rd development counter location.

[Effect]

As mentioned above, when a detection means detects the toner end of development counters other than the development counter developed at last according to this invention, Since the copy paper number of sheets developed to the toner and the front with development counters other than the development mind developed at last is transposed to copy assignment number of sheets and negatives are made to develop with other development counters by this copy assignment number of sheets Irrespective of the development exit status of development counters other than the development counter developed at last, it becomes possible to always obtain only the copy paper of a desired image, and image quality can be inferior, or unsuitable copy paper is not outputted and useless consumption of copy paper can be prevented. Moreover, since this ** by which copy paper remains in equipment does not exist, copy paper in equipment is not soiled at the time of toner exchange etc.

Furthermore, after development termination, since the development counter used as a toner end is moved to a different toner exchange location from a photo conductor and the development location which counters, toner supply (exchange) can be immediately performed after development termination.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
The schematic diagram of the copying machine with which, as for Fig. 1 , this invention is applied, the detail drawing showing [2] the physical relationship of a photo conductor drum and two or more development counters, Fig. 3 the external view of a toner cartridge, and Fig. 4 A control system block Fig., Fig. 5 the whole control flow chart, Fig. 6 , Fig. 7 , Fig. 8 , and Fig. 9 The flow chart of the subroutine, Drawing showing a toner cartridge location and a toner supply location, Fig. 13, Fig. 14, and Fig. 15 are flow charts which show the processing about the control device concerning this invention. [in / in drawing showing / 10 / the memory map of RAM, Fig. 11, and Fig. 12 / the whole equipment]
9 [.. Toner cartridge sensor.] .... A photo conductor drum, 12a, 12b, 12c .. The 1st, 2nd, and 3rd development counter, 33, 34, 35 .. Photosensor, 36

[Translation done.]

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最終頁に続く

(54)【発明の名称】　画像形成装置

(57)【特許請求の範囲】

【請求項１】感光体に形成される静電潜像を現像する異なる色のトナーを収容する複数の現像器と、トナーエンドを検知する検知手段とを有する画像形成装置において、

前記複数の現像器を用いて複数の色を組み合わせて現像を行う場合、最終に現像する現像器以外の現像器のトナーエンドを前記検知手段が検知したとき、最終に現像する現像器以外の現像器でトナーエンド前に現像したコピー紙枚数を複写指定枚数に置き換えて、この複写指定枚数分のみ他の現像器で現像させる制御手段を備えていることを特徴とする画像形成装置。

【請求項２】前記制御手段は、現像終了後、トナーエンドとなる現像器を感光体と対向する現像位置とは異なるトナー交換位置まで移動させることを特徴とする請求項

１記載の画像形成装置。

【発明の詳細な説明】

〔技術分野〕

本発明は異なる色の複数の現像器を有する画像形成装置、例えば複写機、フアクシミリ等に関するものであり、特に特定色のトナーエンド時のトナー制御（トナー補給、交換）方法に係るものである。

〔従来技術〕

複数の色を組み合わせて色合成を行う複写機において、従来は色合成コピー時、例えば３色合成コピー中に１色目の現像色がトナーエンドになつても、その色に関して必要な枚数の現像が終了していたなら次の現像色に切り換えて複写を続行している。そして３色の色合成コピーが終了した後機械は停止するので、ユーザーはトナーエンド色の現像器のトナー交換をする場合、改めてカ

ーカートリツジフイーラ37（第３図）を検出できるように設けられている。

制御装置よりの指定により駆動モータが駆動され、回転フレーム29が例えば図の時計方向に回転される。現像色フイーラ32が第３フオトセンサ35を遮断した時、第1，第２フオトセンサ33，34により現像位置にある現像器の現像剤の色を読み込むことが出来る。図の例では第３フオトセンサ35は回転駆動を停止させるための信号源として用い、所望の現像色の現像器を現像位置に移動停止させること出来る。回転フレーム29を回転することにより順次各現像器の情報がフオトセンサにより検出され、記憶される。この例に対して、各現像器位置の現像器の現像色フイーラを検出するようにフオトセンサ（現像色センサ）を設けると、回転フレームを回転することなく、各位置の現像器の現像色情報を検出することが出来る。

制御装置は例えば第４図に示すような制御システムを有する。この制御装置により画像形成装置は例えば以下のように作動される。

第５図のフローに従つて電源投入後、初期状態設定、カラーホームポジシヨン入力チエツク、待機中処理、現像移動チエツクの各ルーチンが行われる。待機中処理はセンサの読み込み、デイツプスイツチ（Dip SW）を含むキーの読み込み、モード設定等普通の画像形成装置における処理が行われる。デイツプスイツチは手動でON，OFFしその状態を保持するもので、主としてサービスマンが機械の調整、セツトアツプ（ソータオンライン、両面ユニツトオンライン、自動濃度優先、自動用紙選択、ホーム色等に付いて）をするのに用いる。

待機中にプリントキーONにより、複写指定枚数補正処理を行つた後、現像移動チエツク及び通常のコピーシーケンスが行われる。

ジヤムが生じず、使用中の現像器がトナーエンドにならない時はコピー枚数が複写指定枚数になり、指定した現像色の現像が終了するまでコピーシーケンスを続け、コピーが終了すると待機中処理に戻る。

コピー中にジヤムが発生するとジヤムフラグをセツトし、異常処理ルーチンを実行する。

異常処理ルーチンでは機械の駆動を止めたり、正常にコピーが出来なかつた枚数だけコピー枚数カウンタを戻すという処理等が行われる。

異常処理ルーチンからの復帰はCPUをリセツトするため電源OFFすることによる。

コピーの途中で使用中の現像器がトナーエンドになるとDBCOL1（第１現像器位置メモリ）のトナーエンドフラグをセツトする。情報を記憶するRAMマツプの一例は第10図に示す如くである。

ここでトナーエンドの現像色が複写の最終色である時は、コピー続行不可能であるのでカラーホームポジシヨン入力チエツクを経て待機中処理に戻るが、最終色でない時は、複写指定枚数を複写済みのコピー枚数に補正して現像移動リクエスト処理に戻る。

初期状態設定のサブルーチンは、第６図に示すような流れで行われ、RAMマツプ（第10図）の不揮発RAMエリアにジヤムフラグまたはDBCOL1のトナーエンドフラグがセツトされていると、ジヤムフラグ及びDBCOL1～３（第１～第３現像器位置メモリ）のトナーエンドフラグをリセツトし、使用中だつた現像器メモリDBCOL1の現像剤の色をDBCOLMR（現像色バツフアメモリ）に記憶する。

ジヤムフラグ、トナーエンドフラグがセツトされていないと、ジヤムまたはトナーエンドによる異常処理後の初期状態でないのでＰモード（プログラムモード）エリア以外のRAMをクリアし、イニシヤルモードにセツトし、DBCOLHM（ホーム色）の情報をDBCOLMR（電源ON後セツトする現像色用バツフアメモリ）にストアする。

DBCOLMRに情報をストアした後、現像色読み込み処理を第７図に示すフローに従つて行う。

現像色読み込み処理は、電源OFF時に現像器の位置が変えられたり現像器が交換されたりして現像剤の内容と現像器の位置とが前の状態と一致しなくなる可能性があるので、電源OFF→ONの際に必ず行う必要がある。

現像色を読み終えたらDBCOLMRとDBCOL1～３のカラーコードビツトを比較し、同色でカートリツジ有りの時にその現像器位置を記憶しその現像器に付いて現像移動フラグをセツトする。尚、第１現像器位置即ちDBCOL1が同色でカートリツジ有りの時は現像器を移動する必要がないので現像移動フラグのセツトはしない。

次いで現像移動チエツクのサブルーチンを経て待機中処理で戻る。

現像色読み込み処理においては、第７図に示すように最初に現像移動リクエストカウンタに４をセツトし、現像装置回転駆動モータをONする。

現像装置の回転即ち回転フレーム29の回転後、第１フオトセンサ33がOFFからONし、第３フオトセンサ35がOFFからONに変わつた所で現像装置回転駆動モータをOFFする。

これにより現像色フイーラ32が正しくフオトセンサ33～35の位置で止まるように制御することが出来る。

次に現像移動リクエストカウンタをチエツクし、カウンタ値に応じてDBCOL1～３にそれぞれに対応するカラーコードとカートリツジ有無のデータをセツトし、現像器色を１色読み込む度に現像移動リクエストカウンタをデクリメントし、３色読み込んだ所でカウンタが１となり初期状態設定フローに戻る。

カラーコードはフオトセンサによる現像色フイーラの検出信号により定められ、例えば後に示す表１の如く設定されることが出来る。

現像移動チエツクサブルーチンは第８図に示すようなフローにより行われる。

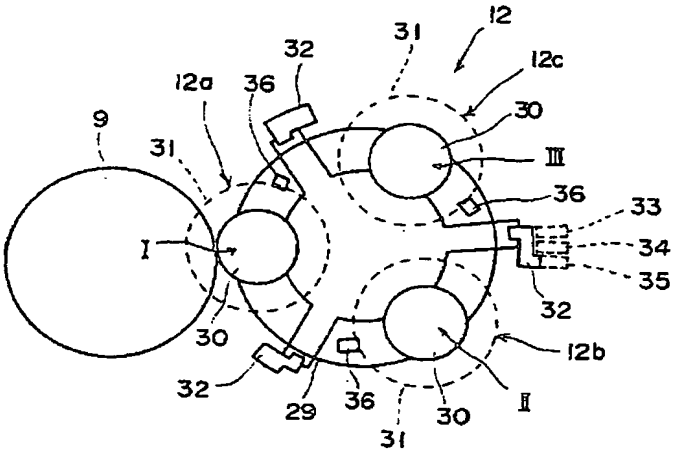
さらに、現像終了後、トナーエンドとなる現像器を感光体と対向する現像位置とは異なるトナー交換位置まで移動させるので、現像終了後すぐにトナー補給（交換）を行うことができる。

【図面の簡単な説明】

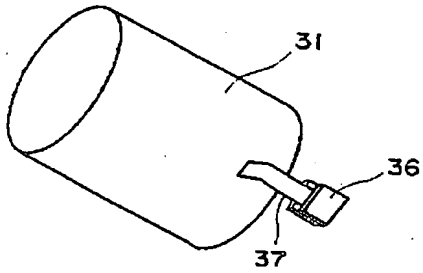
第１図は本発明が適用される複写機の概略図、第２図は感光体ドラムと複数の現像器との位置関係を示す詳細図、第３図はトナーカートリッジの外観図、第４図は制御システムブロック図、第５図は全体の制御フローチャート、第６図，第７図，第８図，第９図はそのサブルーチンのフローチャート、第10図はRAMのメモリマップを示す図、第11図，第12図は装置全体におけるトナーカートリッジ位置及びトナー補給位置を示す図、第13図，第14図，第15図は本発明に係る制御装置に関する処理を示すフローチャートである。

９……感光体ドラム、12a, 12b, 12c……第1, 第2, 第３現像器、33, 34, 35……フォトセンサ、36……トナーカートリッジセンサ。

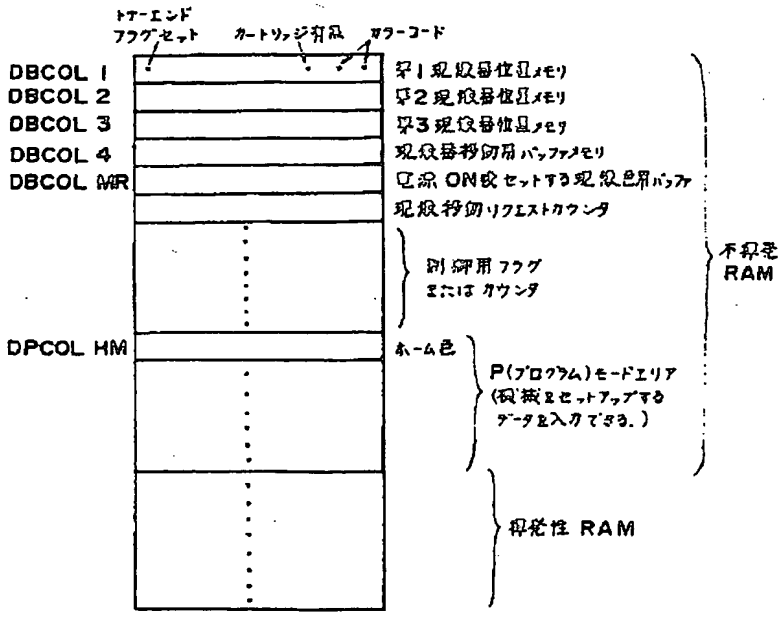
【第２図】



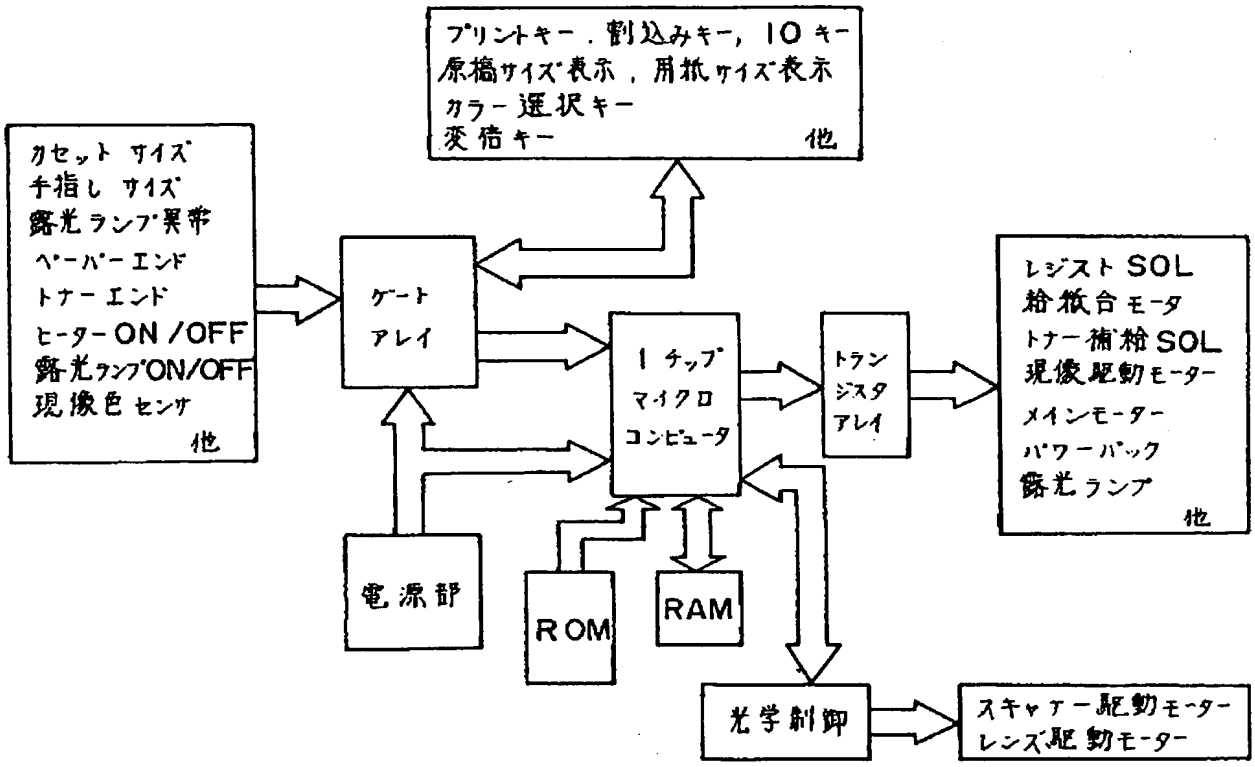
【第３図】



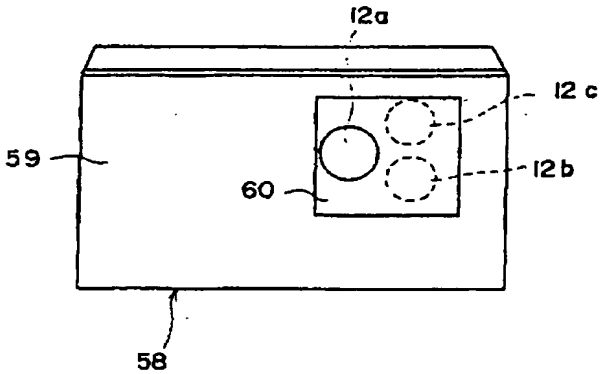
【第１０図】



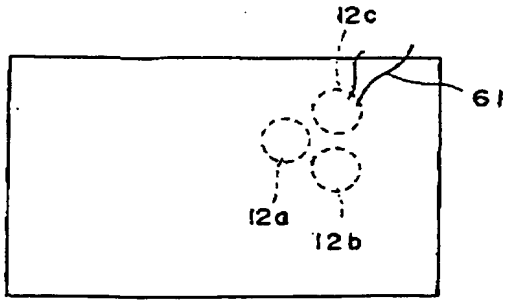
【第４図】



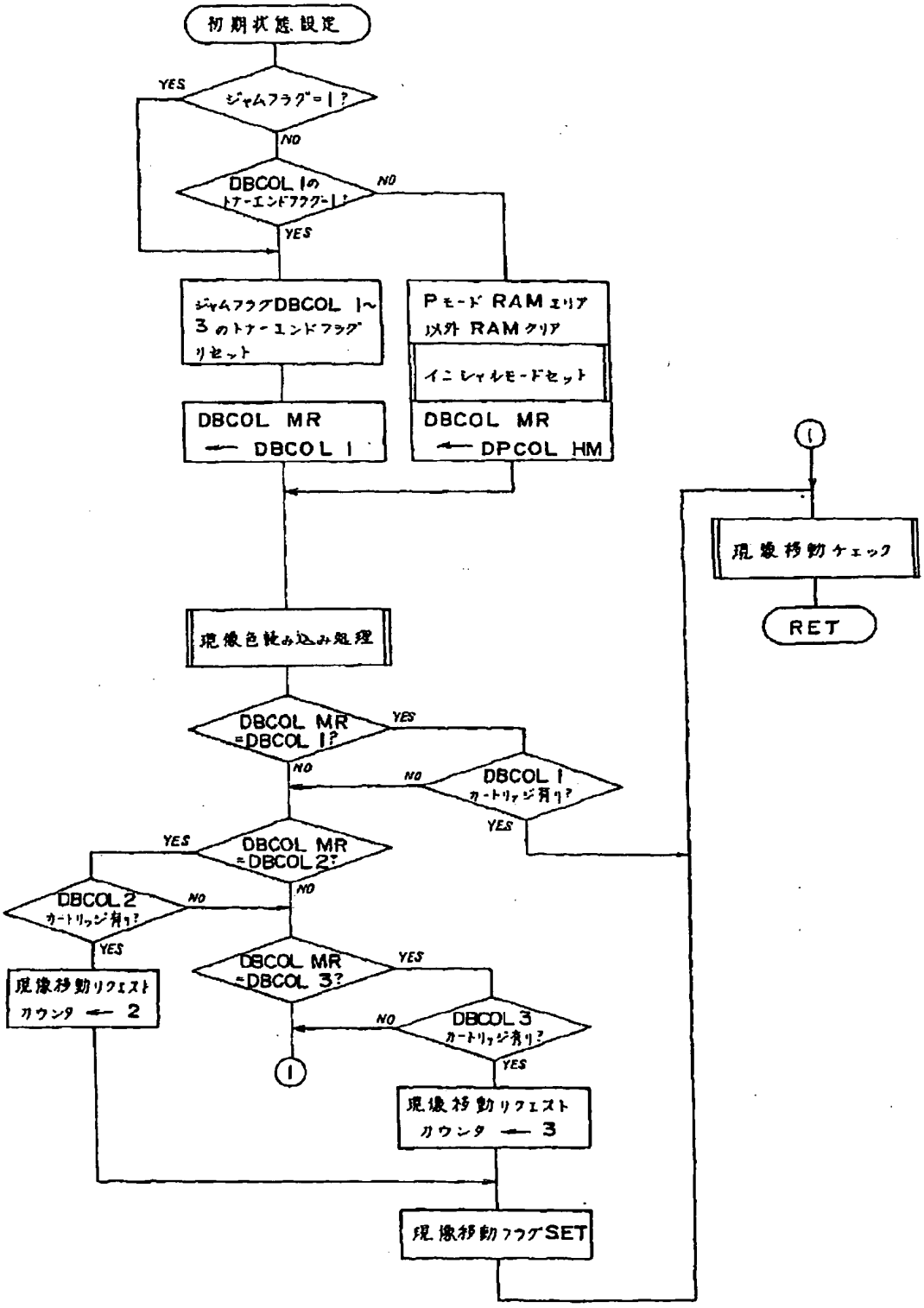
【第１１図】



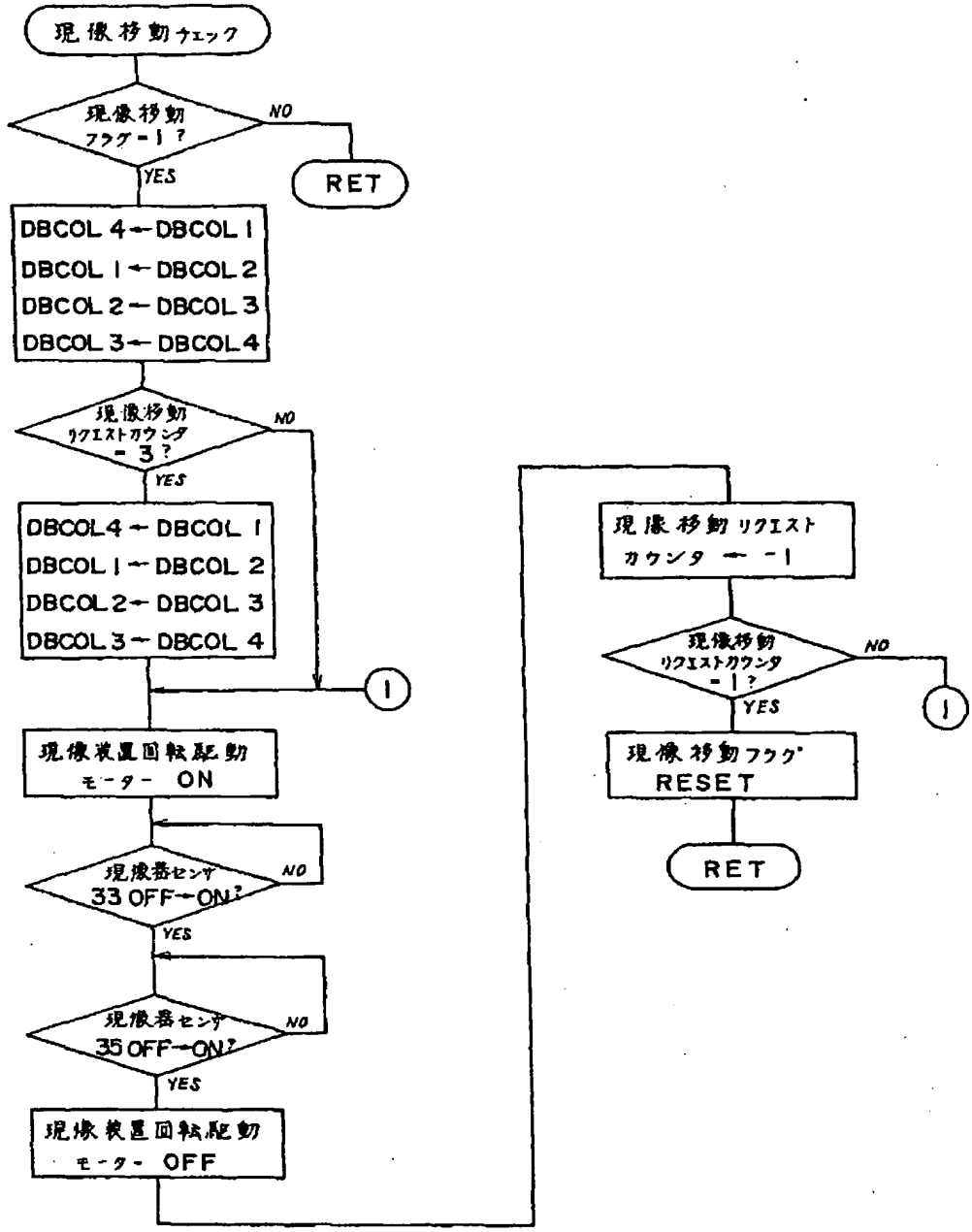
【第１２図】



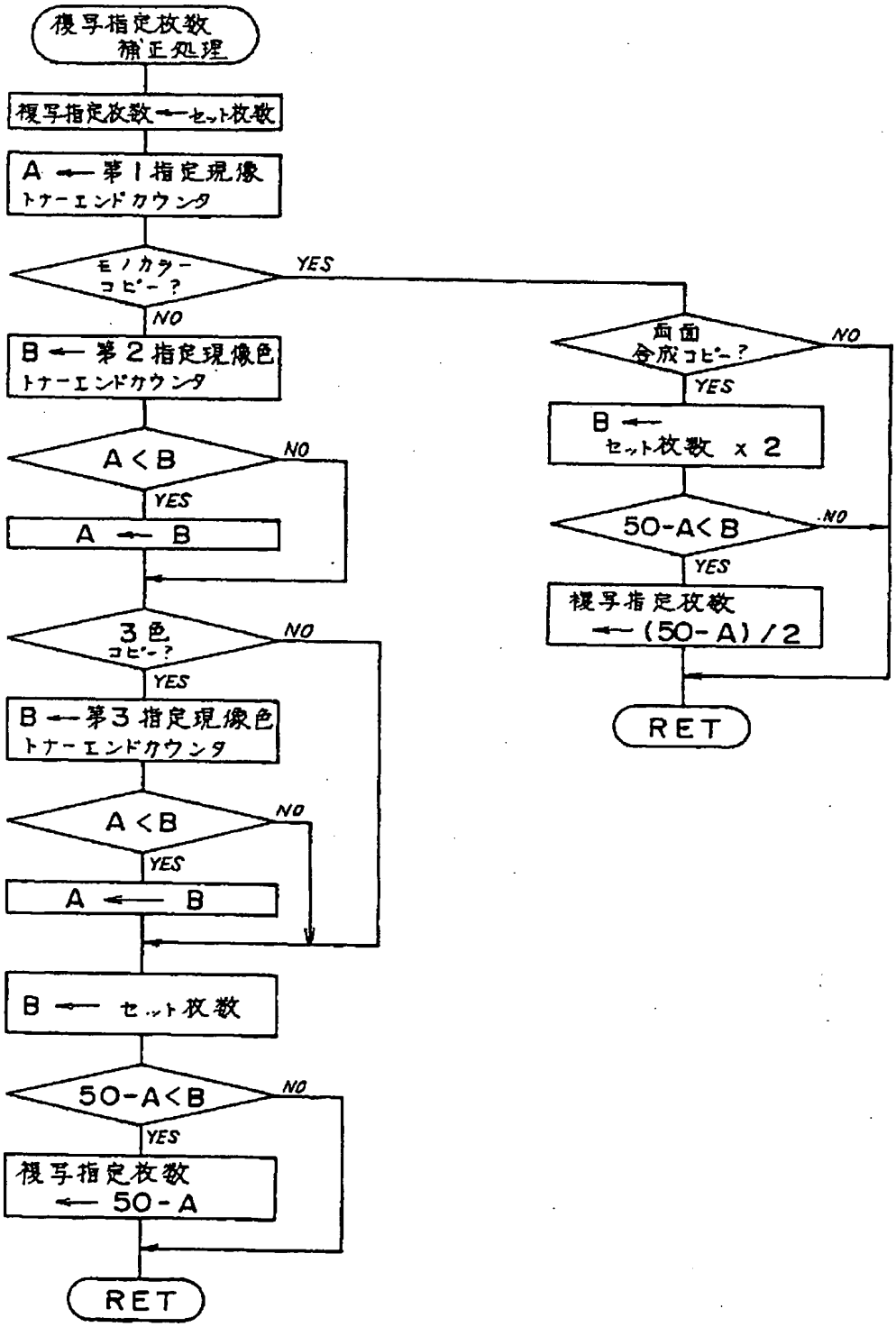
【第6図】


初期状態設定
YES
ジャムフラグ=1?
NO
DBCOL 1の
トナーエンドフラグ=1?
NO
YES
ジャムフラグDBCOL 1~
3のトナーエンドフラグ
リセット
Pモード RAMエリア
以外 RAMクリア
イニシャルモードセット
DBCOL MR
← DBCOL 1
DBCOL MR
← DPCOL HM
現像色検み込み処理
DBCOL MR
=DBCOL 1?
YES
NO
NO
DBCOL 1
カートリッジ有り?
YES
YES
DBCOL MR
=DBCOL 2?
NO
DBCOL 2
カートリッジ有り?
NO
YES
現像移動リクエスト
カウンタ ← 2
DBCOL MR
=DBCOL 3?
YES
NO
DBCOL 3
カートリッジ有り?
YES
現像移動リクエスト
カウンタ ← 3
現像移動フラグSET
①
①
現像移動チェック
RET

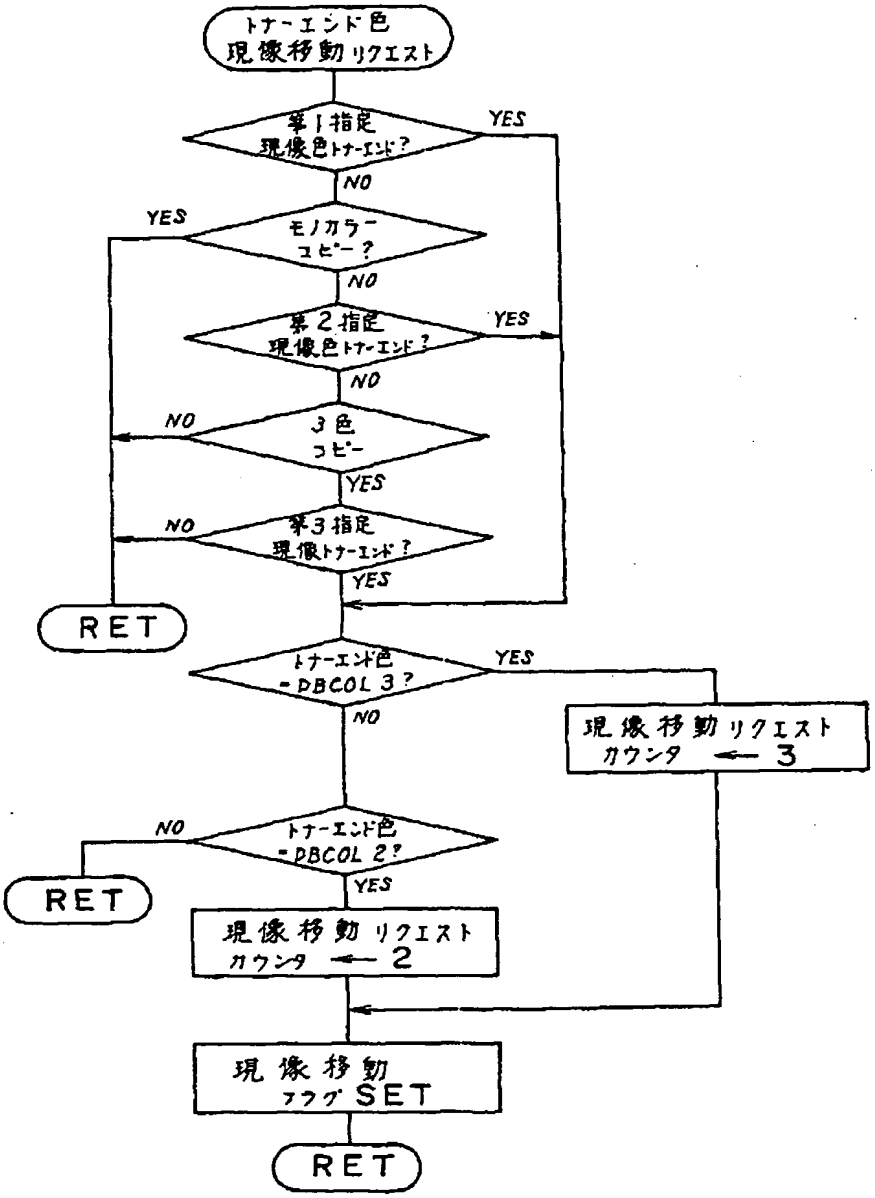
【第8図】


現像移動チェック
現像移動フラグ=1?
NO
YES
RET
DBCOL 4←DBCOL 1
DBCOL 1←DBCOL 2
DBCOL 2←DBCOL 3
DBCOL 3←DBCOL 4
現像移動リクエストカウンタ=3?
NO
YES
DBCOL 4←DBCOL 1
DBCOL 1←DBCOL 2
DBCOL 2←DBCOL 3
DBCOL 3←DBCOL 4
1
現像装置回転駆動モーター ON
現像器センサ33 OFF→ON?
NO
YES
現像器センサ35 OFF→ON?
NO
YES
現像装置回転駆動モーター OFF
現像移動リクエストカウンタ←-1
現像移動リクエストカウンタ=1?
NO
YES
1
現像移動フラグ RESET
RET

【第１３図】


複写指定枚数
補正処理
複写指定枚数←セット枚数
A ← 第1指定現像
トナーエンドカウンタ
モノカラー
コピー？
YES
NO
B ← 第2指定現像色
トナーエンドカウンタ
A<B
NO
YES
A ← B
3色
コピー？
NO
YES
B ← 第3指定現像色
トナーエンドカウンタ
A<B
NO
YES
A ← B
B ← セット枚数
50-A<B
NO
YES
複写指定枚数
← 50-A
RET
両面
合成コピー？
NO
YES
B ←
セット枚数 x 2
50-A<B
NO
YES
複写指定枚数
← (50-A)/2
RET

【第１５図】



フロントページの続き

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